



dSPACE Training 2012

February – July

NEW:

- SCALEXIO
- ASM – Engine InCylinder Simulation

Program

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Welcome

dSPACE offers hands-on experience and practical exercises based on a well-founded theoretical background. The needs of our users, the positive feedback from our participants, and our new product releases are all reasons why we are always introducing more courses.

All training courses that previously included ControlDesk® will be held with dSPACE ControlDesk Next Generation. It unites functionalities that used to be covered by several specialized tools. ControlDesk Next Generation provides access to simulation platforms and connected bus systems, and can perform measurement, calibration and diagnostics on ECUs, for example, via standardized ASAM interfaces. Its flexible, modular structure provides high scalability to meet the requirements of specific application cases. In the ControlDesk Next Generation training courses (p. 7-8), you will gain experience in handling experiments and visualizing model variables on instrument panels. You will learn about data acquisition with ControlDesk and how to handle different data sets.

The AUTOSAR training course (p. 4) introduces you to the main goals and contents of the AUTOSAR standard. In the TargetLink® AUTOSAR Support training course (p. 12), you will design models with the TargetLink AUTOSAR blockset. You will learn to import, export and modify the AUTOSAR information

in TargetLink and the dSPACE Data Dictionary, as well as to validate the behavior of AUTOSAR models by simulation.

The dSPACE SCALEXIO training course (p. 13) will show you which hardware components you need to integrate in order to customize and extend an off-the-shelf hardware-in-the-loop (HIL) simulator so that it matches your requirements. Step by step you will get to know the idea behind HIL simulation and its potential.

If you want to increase the productivity of your test environments by means of automation, see our AutomationDesk® courses (p. 14-15). You can learn how to run tests, generate test reports, and organize the handling of test projects. The AutomationDesk Project Process course (p. 15) guides you through a whole project, from test specification to tests.

Training courses take place in Paderborn, unless stated otherwise. Other courses are also being held at our project centers in Stuttgart and Munich. As an additional service, we can also provide on-site training exclusively for your company.

Check out all of the latest news and additions on our website: www.dspace.com/goto?training

The dSPACE Training Team

AUTOSAR

Over the last few years, the AUTOSAR initiative (Automotive Open System ARchitecture, www.autosar.org) has successfully worked on establishing a standard for automotive software architectures.

This course introduces you to the main goals and contents of this standard. Some of the aspects covered are the methodology behind AUTOSAR, the concept and purpose of the virtual functional bus (VFB), and the different layers of the standard software architecture, which are described in different templates (application layer, run-time environment (RTE), basic software).

Participants

- System engineers, software architects, software developers
- Anyone involved in the development process for automotive software

Goals

- Get an overview of AUTOSAR with the main focus on application software and system modeling
- Learn about the contents of and the relationship between the different documents and templates
- Get to know the basic terminology (e.g. RTE, SWC, VFB)

Course Contents

- Introduction to AUTOSAR
- Methodology of AUTOSAR
- Concept of the virtual functional bus (VFB)
- Software architecture: application layer (software component template)
- System description
- Software architecture: run-time environment (RTE)
- Software architecture: basic software (Basics)

- **AUTOSAR**
(1-Day Training Course)
Fee per person: € 500 (plus tax)

- **Dates**
February 28, 2012
May 08, 2012
July 03, 2012

- **Times**
9:00 a.m. to 5:15 p.m.

SystemDesk®

SystemDesk is a tool for modeling, integrating and simulating complex system architectures and distributed software systems. This training course covers all the steps from modeling a system architecture to generating the AUTOSAR Run-Time Environment (RTE) as well as validating the results with simulations.

Participants

- System engineers, software architects, software developers, software testers, ECU testers
- Recommended: Basic knowledge of AUTOSAR

Goals

- Get an overview of SystemDesk
- Model a software architecture and a complex system
- Integrate a system including RTE Generation
- Simulate a software architecture, a single ECU and an ECU network

Tools and Systems

- SystemDesk Multi ECU Design version
- AUTOSAR RTE Generation Module
- SystemDesk Simulation Module

Course Contents

- Introduction to SystemDesk
- Modeling software architectures
- Implementing software components
- Modeling hardware topologies
- Network communication
- System integration
- AUTOSAR import/export
- Automation options
- SystemDesk simulation features



- **SystemDesk**
(1-Day Training Course)
Fee per person: € 770 (plus tax)
20% discount for universities

- **Dates**
February 29, 2012
May 09, 2012
July 04, 2012
- **Times**
9:00 a.m. to 5:15 p.m.

dSPACE Real-Time Systems

This 2-day training course introduces you to the main features of dSPACE prototyping systems and dSPACE Simulator single-processor systems.

Participants

- Engineers working with rapid prototyping and hardware-in-the-loop (HIL) testing
- Engineers who are new to dSPACE or who plan to purchase dSPACE prototyping systems or simulators in the near future
- Recommended: Experience with MATLAB® and Simulink®

Goals

- Set up dSPACE real-time hardware and corresponding software
- Implement I/O in Simulink
- Build real-time code with Real-Time Interface
- Change parameters and capture data with ControlDesk®
- Learn advanced features

Tools and Systems

- dSPACE single-processor hardware
- MATLAB/Simulink
- Real-Time Interface
- ControlDesk Next Generation

Course Contents

1st Day – Basics

- Software/hardware setup
- Introduction to ControlDesk Next Generation
- ControlDesk platform management
- Introduction to Real-Time Interface
- I/O implementation with Real-Time Interface
- ControlDesk project and experiment management
- ControlDesk instrumentation

2nd Day – Advanced Features

- ControlDesk basic data acquisition
- ControlDesk Table Editor and Data Set Management
- Multitasking and interrupt handling
- Programming S-functions

- **dSPACE Real-Time Systems**
(2-Day Training Course)
Fee per person: € 1070 (plus tax)
20% discount for universities

- **Dates**
February 14-15, 2012 (Paderborn)
March 27-28, 2012 (Project Center Stuttgart)
May 22-23, 2012 (Project Center Munich)
July 10-11, 2012 (Paderborn)

- **Times**
9:00 a.m. to 5:15 p.m.

ControlDesk® Next Generation Basic

Book a 1-day training course to familiarize yourself with ControlDesk Next Generation. Gain experience in handling experiments and visualizing model variables on instrument panels. Learn about data acquisition with ControlDesk Next Generation.

Participants

- Engineers new to ControlDesk
- Engineers who want to switch from ControlDesk 3.x to ControlDesk Next Generation

Goals

- Set up systems with ControlDesk
- Manage projects and experiments
- Build and use virtual instrument panels

Tools and Systems

- ControlDesk Next Generation

Course Contents

- Introduction to ControlDesk
- ControlDesk platform management
- ControlDesk project and experiment management
- ControlDesk instrumentation
- ControlDesk Table Editor
- ControlDesk data acquisition



■ ControlDesk Next Generation Basic

(1-Day Training Course)

Fee per person: € 770 (plus tax)

20% discount for universities

In combination with ControlDesk Next Generation Advanced, the overall fee per person is € 1070 (plus tax).

■ Dates

February 28, 2012

April 17, 2012

June 26, 2012

■ Times

9:00 a.m. to 5:15 p.m.

ControlDesk®

Next Generation Advanced



This course covers the advanced steps in ControlDesk Next Generation. It is ideal for acquiring all-around information about ControlDesk's advanced features, such as ControlDesk Signal Editor or the Bus Navigator.

Participants

- Engineers interested in increasing their knowledge of ControlDesk's advanced features

Goals

- Learn about the advanced measurement concept
- Automate ControlDesk
- Use ControlDesk Bus Navigator
- Use ControlDesk Signal Editor

Tools and Systems

- ControlDesk Next Generation
- Bus Navigator
- Signal Editor

Course Contents

- Advanced measurement and recording
- Signal Editor
- Bus Navigator
- Data set handling
- Introduction to ControlDesk Automation
- ControlDesk event handling

■ ControlDesk Next Generation Advanced

(1-Day Training Course)

Fee per person: € 770 (plus tax)

20% discount for universities

In combination with ControlDesk Next Generation Basic, the overall fee per person is € 1070 (plus tax).

■ Dates

February 29, 2012 (Paderborn)

May 24, 2012 (Project Center Munich)

■ Times

9:00 a.m. to 5:15 p.m.

RapidPro

Integrating automotive sensors and actuators is a key task in rapid prototyping performed for electronic control unit functions. dSPACE's RapidPro hardware provides unprecedented flexibility in adapting sensor and actuator signals to prototyping platforms (dSPACE MicroAutoBox/AutoBox). The RapidPro training gives you a step-by-step introduction to using the RapidPro software and hardware together with a dSPACE prototyping system. You will learn how to configure the RapidPro system with the ConfigurationDesk® configuration software and to implement the required I/O with the RapidPro Control Unit Blockset if you work with a RapidPro Control Unit. If you are not familiar with the dSPACE prototyping systems or with the ControlDesk® and Real-Time Interface software, it is recommended to request this course in combination with the dSPACE Real-Time Systems course (p. 6).

Participants

- Engineers working with rapid prototyping
- Engineers who want to use the dSPACE prototyping systems and the RapidPro hardware and software
- Necessary: Experience with MATLAB® and Simulink®, as well as ControlDesk and Real-Time Interface

Goals

- Set up RapidPro signal conditioning and power stages
- Configure the RapidPro Units with ConfigurationDesk
- Learn about the structure and features of the RapidPro system
- Implement the I/O of a RapidPro Control Unit with the corresponding Real-Time Interface

Tools and Systems

- dSPACE prototyping systems
- Real-Time Interface
- ControlDesk Next Generation
- RTI RPCU Blockset
- ConfigurationDesk
- MATLAB/Simulink

Course Contents

- Introduction to the RapidPro hardware
- Introduction to ConfigurationDesk
- Monitoring and diagnostics of a RapidPro System
- Introduction to the RapidPro RTI blocksets

- **RapidPro**
(1-Day Training Course)
Fee per person: € 770 (plus tax)
20% discount for universities

- **Dates**
On request

TargetLink® Basic

This basic training course covers all the steps of code generation for production ECUs with TargetLink. TargetLink automatically generates production-quality C code for fixed-point and floating-point controllers directly from Simulink®/Stateflow® models. The entire work process of transforming a Simulink/Stateflow diagram into an ECU executable is shown, as well as code integration details and TargetLink configuration options.

Participants

- Control strategy engineers, system engineers, function and software developers
- Recommended: Experience with ANSI-C programming, especially for production ECUs
- Necessary: Experience with MATLAB® and Simulink

Goals

- Get an overview of TargetLink
- Transfer a Simulink subsystem to a target ECU
- Understand code generation options
- Customize TargetLink to your company environment

Tools and Systems

- TargetLink Base Suite with simulation and optimization modules

Course Contents

- TargetLink blockset
- Scaling a model
- Implementation options
- Code generation
- Code integration issues
- Simulation and code verification
- Document generation
- TargetLink API



■ TargetLink Basic

(1-Day Training Course)

Fee per person: € 770 (plus tax)

20% discount for universities

In combination with TargetLink Advanced, the overall fee per person is € 1070 (plus tax).

■ Dates

February 14, 2012 (Paderborn)

March 20, 2012 (Project Center Stuttgart)

April 24, 2012 (Paderborn)

June 12, 2012 (Project Center Munich)

July 17, 2012 (Paderborn)

■ Times

9:00 a.m. to 5:15 p.m.

TargetLink® Advanced

TargetLink offers a lot of features for advanced users. One of them is the dSPACE Data Dictionary for model-independent data management. In addition, a freely installable blockset allows models to be exchanged even without a TargetLink license.

Participants

- Control strategy engineers, system engineers, function and software developers
- Necessary: Experience with MATLAB® and Simulink®, as well as TargetLink

Goals

- Use the TargetLink features and optimization options for production code generation
- Integrate TargetLink into your company environment

Tools and System

- TargetLink including all modules

Course Contents

- The dSPACE Data Dictionary
- Testing the code coverage of the application
- Code and data variants
- Integration of custom code
- Model referencing



■ TargetLink Advanced

(1-Day Training Course)

Fee per person: € 770 (plus tax)

20% discount for universities

In combination with TargetLink Basic,
the overall fee per person is € 1070 (plus tax).

■ Dates

February 15, 2012 (Paderborn)

March 21, 2012 (Project Center Stuttgart)

April 25, 2012 (Paderborn)

June 13, 2012 (Project Center Munich)

July 18, 2012 (Paderborn)

■ Times

9:00 a.m. to 5:15 p.m.

TargetLink® AUTOSAR Support

TargetLink supports the generation of AUTOSAR-compliant code, and files generated by AUTOSAR authoring tools can be imported into TargetLink. With the TargetLink AUTOSAR blockset, information from the files can be referenced and used during code generation. Simulations are run to validate the behavior of the model and the generated code. Finally, TargetLink generates AUTOSAR description files for import into other tools.

Participants

- System engineers, software architects, and software developers
- Necessary: Experience with TargetLink and the dSPACE Data Dictionary as well as basic knowledge of AUTOSAR

Goals

- Import, export and modify the AUTOSAR information in TargetLink and the dSPACE Data Dictionary
- Design models with the TargetLink AUTOSAR blockset
- Validate the behavior of AUTOSAR models by simulation
- Learn the role of TargetLink in the workflow according to AUTOSAR

Tools and System

- TargetLink AUTOSAR blockset
- AUTOSAR fragment from the dSPACE Data Dictionary

Course Contents

- Importing and exporting AUTOSAR data
- Modifying AUTOSAR information in the dSPACE Data Dictionary
- How to use the TargetLink AUTOSAR blockset
- Simulating AUTOSAR models
- Interaction between TargetLink and SystemDesk

- **TargetLink AUTOSAR Support**
(1-Day Training Course)
Fee per person: € 770 (plus tax)
20% discount for universities

- **Date**
April 26, 2012
- **Times**
9:00 a.m. to 5:15 p.m.

NEW: dSPACE SCALEXIO® System

Hardware-in-the-loop (HIL) simulation makes it possible to test new ECUs and software in a largely virtual environment throughout the entire development cycle, without real vehicles or prototypes. The idea is to connect real ECU prototypes to real-time models of the vehicle and its mechanical, electrical, hydraulic and electronic components. This allows systematic and fully automated testing of the ECU and the entire electronic vehicle system.

This course uses the new dSPACE SCALEXIO HIL technology to demonstrate which hardware components you need to integrate in order to customize and extend an off-the-shelf simulator so that it matches your requirements. Step by step, you will learn the idea behind HIL simulations and the potential they offer.

Please note: ControlDesk® Next Generation and AutomationDesk® are not covered by this course. If you want to learn about the extensive and powerful method of automated testing in combination with ECU diagnostics, fault simulation, and report generation, we recommend to book this course in conjunction with the AutomationDesk courses.

Participants

- Engineers who want to use and customize an off-the-shelf dSPACE SCALEXIO system to their own requirements.
- Necessary: Experience in using dSPACE ControlDesk Next Generation and MATLAB®/Simulink®

- **dSPACE SCALEXIO System**
(2-Day Training Course)
Fee per person: € 1070 (plus tax)
20% discount for universities

The number of participants is limited to six persons.

Goals

- Become familiar with the SCALEXIO philosophy
- Learn about the requirements and the capabilities of HIL
- Plan, set up and expand a SCALEXIO system
- Use ConfigurationDesk® to describe the connected devices (ECUs, loads), to assign I/O functions and hardware, and to connect the I/O to the model
- Integrate ECUs and simulate failures for diagnostic purposes

Tools and Systems

- dSPACE SCALEXIO HIL system
- MATLAB/Simulink
- ControlDesk Next Generation
- ConfigurationDesk

Course Contents

- Structure of a SCALEXIO test system
- HighFlex and MultiCompact I/O
- Planning and setting up a HIL project
- Configuring and customizing a dSPACE SCALEXIO system
- ConfigurationDesk to set up the simulator
- Failure simulation
- Examples of signal generation and acquisition

- **Dates**
February 22-23, 2012
April 18-19, 2012
June 27-28, 2012

- **Times**
9:00 a.m. to 5:15 p.m

AutomationDesk®

The course covers the use of dSPACE platforms as well as a wide variety of tools to access the Failure Insertion Unit, calibration and diagnostic tools and MATLAB®. It shows you how to work with custom libraries filled with self-defined generic test steps, test sequences and complete tests, and gives you hands-on experience of the Test Framework Library with lots of internal functions for reporting, test evaluation and handling exceptions inside each test.

Participants

- Engineers interested in increasing the productivity of their test environments by means of automation
- Recommended: Experience with ControlDesk® Next Generation

Goals

- Set up automatic tests efficiently
- Develop reusable tests based on library blocks
- Develop tests efficiently using debugging and offline execution
- Generate meaningful test reports
- Capture and manipulate real-time signals
- Perform automatic signal evaluation and post-processing
- Access third-party hardware and software via AutomationDesk libraries
- Structure tests with the AutomationDesk Test Framework

Tools and Systems

- AutomationDesk
- ControlDesk Next Generation

Course Contents

- Running tests and generating test reports
- Structuring test projects
- Test description using custom library blocks
- Graphical test development
- Introduction to AutomationDesk's predefined test steps
- Access to real-time parameters
- Introduction to AutomationDesk libraries for accessing external devices
- Using signal stimulation in test automation
- Structure of generic test blocks
- AutomationDesk Test Framework
- Introduction to AutomationDesk's application interface



- **AutomationDesk**
(2-Day Training Course)
Fee per person: € 1070 (plus tax)
20% discount for universities

In combination with the AutomationDesk Project Process course, the overall fee per person is € 1380 (plus tax).

- **Dates**
March 06-07, 2012
May 08-09, 2012
June 19-20, 2012

- **Times**
9:00 a.m. to 5:15 p.m.

AutomationDesk® Project Process

The course discusses the structures and processes needed to integrate AutomationDesk in an existing test process. You are guided through a whole project from test specification to tests. You will build custom libraries and then use them to create implementations. The course explains the interrelation between the structure of a test project and corresponding custom library test steps. It also discusses the conventions necessary for AutomationDesk elements, real-time model structure and test specifications to guarantee test reusability with a minimum of effort.

Participants

- Engineers who are familiar with AutomationDesk

Goals

- Use AutomationDesk in a real project
- Understand the rules for reusable custom library elements
- Structure projects and custom libraries to provide a solid basis for a large number of tests
- Get to know a real-time model interface suitable for test automation

Tools and Systems

- ControlDesk® Next Generation
- AutomationDesk

Course Contents

- Using AutomationDesk in a test automation project
- Building custom libraries of basic test steps held in libraries of test step groups and complete tests
- Creating AutomationDesk projects for handling large numbers of tests
- Conventions and structures that ensure traceability from test specification to test report.
- Roles of test automation team members and associated tasks and qualifications
- Checklist of preconditions that must be fulfilled before test automation can start



■ AutomationDesk Project Process

(1-Day Training Course)

Fee per person: € 770 (plus tax)

20% discount for universities

In combination with the AutomationDesk course, the overall fee per person is € 1380 (plus tax).

■ Date

June 21, 2012

■ Times

9:00 a.m. to 5:15 p.m.

Real-Time Testing

Real-time hardware can be accessed via an interpreter running on the processor board. Since the interpreter is executed at the same rate as the real-time application, it can be used to perform real-time tests. This training course provides an introduction to programming real-time tests based on the Python programming language. Course participants will discuss standard applications and implement them in practical examples.

Participants

- Engineers familiar with Python programming and real-time applications

Goals

- Use Python to describe real-time tests
- Set up a workflow for real-time testing
- Understand the structure of real-time tests
- Create standard implementations and their temporal behavior

Tools and Systems

- ControlDesk® Next Generation
- AutomationDesk®
- Real-time hardware

Course Contents

- The necessity of real-time tests
- Workflow of real-time testing (from script to executable real-time test, test management)
- Introduction to special Python programming elements for real-time testing
- Structure of real-time tests (initialization phase, time-synchronous execution)
- Accessing model variables from real-time tests
- Test modularization
- Relation between Python scripts on the PC and on the real-time platform
- Libraries for test automation by real-time testing (e.g., for variable access, mapping test parallelity, and data exchange between independent tests)
- Implementing standard test scenarios

■ Real-Time Testing

(1-Day Training Course)

Fee per person: € 770 (plus tax)

20% discount for universities

■ Date

March 08, 2012

■ Times

9:00 a.m. to 5:15 p.m.

RTI CAN MultiMessage Blockset

The RTI CAN MultiMessage Blockset can especially be used for handling the complex CAN setups which typically occur in testing environments for ECUs. It is a time-efficient and cost-efficient solution for managing complex CAN setups in Simulink® and from ControlDesk® and AutomationDesk®, with as little manual editing effort as possible.

In this training course, you will learn how to use the RTI CAN MultiMessage Blockset and manage large CAN message bundles (> 200 messages) from one Simulink block.



- **RTI CAN MultiMessage Blockset**
(1-Day Training Course)
Fee per person: € 770 (plus tax)
20% discount for universities

Participants

- Engineers working with complex CAN setups
- Recommended: Experience with ControlDesk Next Generation and MATLAB®/Simulink
- Necessary: Experience with CAN

Goals

- Run restbus simulation
- Handle the special CAN testing features
- Use a software gateway and a manipulation gateway
- Integrate CAN communication into the Simulink model

Tools and Systems

- RTI CAN MultiMessage Blockset
- Simulink
- Real-Time Workshop®
- ControlDesk Next Generation with the Bus Navigator

Course Contents

- Configuring the RTI CAN MultiMessage Blockset
- Parameterization based on a DBC file
- Generating layouts automatically
- User-specific solutions:
 - Custom code
 - Checksums
 - Variant handling

Dates

February 09, 2012
May 10, 2012

Times

9:00 a.m. to 5:15 p.m.

ASM – Vehicle Dynamics

The Vehicle Dynamics Simulation Package is an open Simulink® model for real-time simulation of vehicle dynamics behavior within an environment.

The model is typically used on dSPACE Simulator for hardware-in-the-loop (HIL) testing of ECUs or during the design phase of controller algorithms for early validation by offline simulation. It is a complete and independent model that supports all the relevant phases of the model-based development process. All Simulink blocks in the model are visible, so it is easy to add or replace components with custom models to adapt the vehicle's properties perfectly to individual projects. Roads and driving maneuvers can be easily and intuitively created using graphical tools with preview and clear visualization. You will learn about the concept and the structure of the ASM Vehicle Dynamics model. The course will also deal with the options for parameterizing the vehicle, as well as the road generator and maneuver editor.

Participants

- Engineers working on HIL testing of ECUs for vehicle dynamics
- Engineers who validate controller algorithm designs by doing offline simulation
- Necessary: Experience with MATLAB® and Simulink

Goals

- Get an overview of the ASM Vehicle Dynamics Simulation Package
- Use the ASM Vehicle Dynamics model offline and on a dSPACE system
- Create roads and maneuvers with ModelDesk
- Parameterize the model
- Visualize vehicle movements in a virtual scene with MotionDesk
- Visualize and measure signals in ModelDesk

Tools and Systems

- ASM Vehicle Dynamics Simulation Package including ModelDesk and MotionDesk
- MATLAB/Simulink

Course Contents

- Introduction to the ASM Vehicle Dynamics Simulation Package
- Using the model for offline simulation
- Using the model for online simulation on dSPACE hardware
- Preparing the model for animation with MotionDesk
- Generating roads using ModelDesk
- Generating maneuvers using ModelDesk
- Parameterizing the model using ModelDesk

- **ASM – Vehicle Dynamics**
(2-Day Training Course)
Fee per person: € 1070 (plus tax)
20% discount for universities

- **Date**
March 13-14, 2012
- **Times**
9:00 a.m. to 5:15 p.m.

ASM – Engine Simulation

For engine applications, dSPACE offers a Diesel and a Gasoline Engine Simulation Package. Both are open Simulink® models for the real-time simulation of engines. They are fully integrated into the dSPACE tool chain and are typically used on dSPACE Simulator for hardware-in-the-loop (HIL) testing of ECUs. They are complete and independent engine models that support all the relevant phases of the model-based development process, from early controller design to testing in the laboratory. Since the simulation packages are open Simulink models, users can simply add components or replace them with custom models to meet specific project requirements. The model parameters can even be tuned while online simulations are running. You will learn about the concept and the structure of the ASM Engine Simulation models. The course will also deal with the options for parameterizing the engine.

Participants

- Engineers working on HIL testing of ECUs in the area of engine applications
- Engineers who validate controller algorithm designs by doing offline simulation
- Necessary: Experience with MATLAB® and Simulink

- **ASM – Engine Simulation**
(2-Day Training Course)
Fee per person: € 1070 (plus tax)
20% discount for universities

Goals

- Get an overview of the ASM Engine Simulation Packages
- Use the ASM Engine model offline and on a dSPACE system
- Parameterize the model

Tools and Systems

- ASM Diesel Engine Simulation Package
- ASM Gasoline Engine Simulation Package
- MATLAB/Simulink

Course Contents

- Introduction to the ASM Engine Simulation Packages
- Using the model for offline simulation
- Using the model for online simulation on dSPACE hardware
- Measurement of engine data
- Parameterization of the model



- **Date**
May 22-23, 2012
- **Times**
9:00 a.m. to 5:15 p.m.

NEW: ASM – Engine InCylinder Simulation

The ASM Diesel Engine InCylinder Simulation Package and the ASM Gasoline Engine InCylinder Simulation Package are open Simulink® models for developing and testing advanced electronic control units (ECUs) that support engine management based on in-cylinder pressure, variable valve timing, etc. They are fully integrated into the dSPACE tool chain and are typically used on a dSPACE Simulator for hardware-in-the-loop (HIL) testing of ECUs. They are complete and independent engine models that support all the relevant phases of the model-based development process, from early controller design to testing in the laboratory. Since the simulation packages are open Simulink models, users can simply add components or replace them with custom models to meet specific project requirements. The model parameters can even be tuned while online simulations are running. You will learn about the concept and the structure of the ASM Engine InCylinder Simulation models. The course will also explain the basics of in-cylinder-pressure-based engine simulation. Other items covered are engine model parameterization and model parameter optimization.

Participants

- Engineers working on HIL testing of ECUs in the area of advanced engine applications
- Engineers who validate controller algorithm designs by doing offline simulation
- Necessary: Experience with MATLAB® and Simulink

- **ASM – Engine InCylinder Simulation (2-Day Training Course)**
Fee per person: € 1070 (plus tax)
20% discount for universities

Goals

- Get an overview of the ASM Engine InCylinder Simulation Packages
- Use the ASM Engine InCylinder model offline and on a dSPACE system
- Parameterize the model
- Optimize parameters

Tools and Systems

- ASM Diesel Engine InCylinder Simulation Package
- ASM Gasoline Engine InCylinder Simulation Package
- MATLAB/Simulink

Course Contents

- Introduction to in-cylinder-pressure-based engine simulation
- Introduction to the ASM Diesel / Gasoline Engine InCylinder Simulation Packages
- Offline simulation with the model
- Online simulation with the model on dSPACE hardware
- Measuring engine data
- Parameterizing the model
- Optimizing model parameters

Dates

On request

Times

9:00 a.m. to 5:15 p.m.

dSPACE FlexRay Configuration Package

The dSPACE FlexRay Configuration Package is used to integrate dSPACE hardware as simulation nodes or monitoring nodes in a FlexRay network. Nodes are configured with the dSPACE FlexRay Configuration Tool according to a communication matrix containing scheduling information for signals and frames transmitted via the FlexRay bus. The communication information is linked to a MATLAB®/Simulink® model by the RTI FlexRay Configuration Blockset. The resulting FlexRay application can be executed on a dSPACE system. The package is an extensive solution for using FlexRay in dSPACE's MicroAutoBox or modular systems.

In this training course, you will learn how to configure a dSPACE system as a simulation node in a FlexRay network and create application-specific Simulink models. Additional special features such as failure simulation and implementing CRC algorithms are also covered.

Participants

- Function developers and engineers who want to use FlexRay on an RCP or HIL system
- Control strategy system engineers
- Necessary: Experience in using dSPACE products (ControlDesk® Next Generation, Real-Time Interface) and MATLAB/Simulink
- Recommended: Experience with FlexRay

Goals

- Simulate one or more nodes in a FlexRay network
- Perform restbus simulation

Tools and Systems

- dSPACE FlexRay Configuration Package
- Real-Time Interface (RTI)
- ControlDesk Next Generation with Bus Navigator

Course Contents

- Basic principles of FlexRay
- Overview of FlexRay hardware and software
- Workflow of the dSPACE FlexRay Configuration Package
- dSPACE FlexRay Configuration Tool
- RTI FlexRay Configuration Blockset
- Introduction to the ControlDesk Next Generation Bus Navigator for FlexRay
- Overview of failure simulation methods
- Using CRC algorithms

- **dSPACE FlexRay Configuration Package**
(1-day Training Course)
Fee per person: € 770 (plus tax)
20% discount for universities

- **Dates**
March 01, 2012
May 15, 2012
- **Times**
9:00 a.m. to 5:30 p.m.

What We Offer

Learning by Doing

Our training rooms are equipped with one dSPACE system for every two participants. The number of participants is limited to twelve. When a course is booked to capacity, we use two trainers to guarantee that each participant gets optimal support. For the dSPACE SCALEXIO training course, the number of participants is limited to six.

Ask the Expert

The instructors are experienced dSPACE application engineers.

Language

The courses are held in English or German, depending on the nationality of the participants.

Included

The fee includes course material (in English), a certificate for successful participation, lunch, coffee and refreshments.

Customer-Specific Training

We offer on-site training and individual training on demand. A minimum of 4 participants is required. For special schedules, please contact us via phone or e-mail.

Dress

We recommend casual clothing.



Registration and Location

How to Register

Please register at least 14 days before the training course begins.

Fill in the registration form (p. 27), and fax or mail it to us. If you want to register more than one participant, please use a copy for each additional person.

You can also register online at
www.dspace.de/goto?training

Fees and Schedule

The fee for a 1-day training course is € 770 (plus tax).

If you book a 2-day training course or two directly consecutive courses (e.g., the TargetLink Basic and Advanced courses) the fee is € 1070 (plus tax). If you book three directly consecutive courses, the fee is € 1380 (plus tax).

Please pay the participation fee after receiving your confirmation of registration and the invoice. With the confirmation you will also receive a map showing how to reach us and information about accommodation.



Accommodation

Please use the hotel list which you receive with your confirmation to reserve a room yourself. The participation fee does not include accommodation and travel.

Cancellation

Please note that we will charge you € 25 if you cancel your registration 14 days before the training course begins. If you cancel after that date, we will charge you 50% of the training fee.

Switching Participants

It is possible to switch participants without paying any additional fee. Please inform us of the change.

How to Reach Us

■ By plane to Paderborn

The Paderborn-Lippstadt Airport is just 20 minutes away from dSPACE by car. For more information, please see www.flughafen-paderborn-lippstadt.de

■ By plane to Stuttgart

Stuttgart Airport is just 30 minutes away from the dSPACE project center by car. For more information, please see www.stuttgart-airport.com

■ By plane to Munich

Munich Airport is just 30 minutes away from the dSPACE project center by car. For more information, please see www.munich-airport.de

■ By train

For train schedules, please see www.bahn.de

■ By car

If you come by car, please use the map in the company section of our Web site www.dspace.com

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training@dspace.de



Overview

AUTOSAR

Introduction to the main goals and contents of the AUTOSAR standard

SystemDesk®

From modeling a system architecture to generating the AUTOSAR Runtime Environment (RTE)

dSPACE Real-Time Systems

Single-processor systems in detail (dSPACE prototyping systems and dSPACE Simulator)

ControlDesk® Next Generation Basic

Introduction to ControlDesk's instrumentation and management features

ControlDesk Next Generation Advanced

Introduction to more features such as ControlDesk Automation and the Bus Navigator

RapidPro

Introduction to the RapidPro System

TargetLink® Basic

The workflow from a Simulink® model to code generation with TargetLink

TargetLink Advanced

More features to customize and validate the code generation

TargetLink AUTOSAR Support

Generation of AUTOSAR-compliant code

dSPACE SCALEXIO® System

Introduction to SCALEXIO

AutomationDesk®

Test automation and test management based on AutomationDesk

AutomationDesk Project Process

Using AutomationDesk in a small project and building a custom-library-based test solution

Real-Time Testing

Introduction to programming real-time tests based on the Python programming language

RTI CAN MultiMessage Blockset

Handling of complex CAN setups in hardware-in-the-loop applications

ASM – Vehicle Dynamics

Real-time simulation of vehicle dynamics behavior within a development environment

ASM – Engine Simulation

Real-time simulation of diesel and gasoline engines

ASM – Engine InCylinder Simulation

Real-time simulation of an in-cylinder-pressure-based engine

dSPACE FlexRay Configuration Package

Simulation of one or more nodes in FlexRay networks

Overview

■ February

Thu 09	RTI CAN MultiMessage Blockset
Tue 14 / Wed 15	dSPACE Real-Time Systems
Tue 14	TargetLink® Basic
Wed 15	TargetLink Advanced
Wed 22 / Thu 23	dSPACE SCALEXIO® System
Tue 28	ControlDesk® Next Generation Basic
Tue 28	AUTOSAR
Wed 29	ControlDesk Next Generation Advanced
Wed 29	SystemDesk®

■ March

Thu 01	dSPACE FlexRay Configuration Package
Tue 06 / Wed 07	AutomationDesk®
Thu 08	Real-Time Testing
Tue 13 / Wed 14	ASM – Vehicle Dynamics
Tue 20	TargetLink Basic (PCS)
Wed 21	TargetLink Advanced (PCS)
Tue 27 / Wed 28	dSPACE Real-Time Systems (PCS)

■ April

Tue 17	ControlDesk Next Generation Basic
Wed 18 / Thu 19	dSPACE SCALEXIO System
Tue 24	TargetLink Basic
Wed 25	TargetLink Advanced
Thu 26	TargetLink AUTOSAR Support

■ May

Tue 08 / Wed 09	AutomationDesk
Tue 08	AUTOSAR
Wed 09	SystemDesk
Thu 10	RTI CAN MultiMessage Blockset
Tue 15	dSPACE FlexRay Configuration Package
Tue 22 / Wed 23	ASM – Engine Simulation
Tue 22 / Wed 23	dSPACE Real-Time Systems (PCM)
Thu 24	ControlDesk Next Generation Advanced (PCM)

■ June

Tue 12	TargetLink Basic (PCM)
Wed 13	TargetLink Advanced (PCM)
Tue 19 / Wed 20	AutomationDesk
Thu 21	AutomationDesk Project Process
Tue 26	ControlDesk Next Generation Basic
Wed 27 / Thu 28	dSPACE SCALEXIO System

■ July

Tue 03	AUTOSAR
Wed 04	SystemDesk
Tue 10 / Wed 11	dSPACE Real-Time Systems
Tue 17	TargetLink Basic
Wed 18	TargetLink Advanced

PCS = Project Center Stuttgart

PCM = Project Center Munich

dSPACE Training 2012 – Registration Form

Training & Date	
Company*	
Last Name*	First Name*
Title	Profession
Department	
Street/P.O.Box*	
ZIP/Postal Code*	City*
State/Province	Country
Phone/Fax*	Email*
* Required field	
I hereby register for the above training course. I am fully aware of the conditions of participation.	
Date/Signature	

Invoice address, if different:

Company	
Last Name	First Name
Title	Profession
Department	
Street/P.O.Box	
ZIP/Postal Code	City
State/Province	Country
Phone/Fax	Email

Note (You can add any extra information such as special dietary requirements here.)

Please send or fax dSPACE Training 2012, Training department
Fax: +49 5251 16198-0, Online registration: www.dspace.de/goto?training

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